### **Regulatory WLAN Antenna Information**

Platform			
Platform Owner	DELL		
Brand Name	DELL		
Model Name	Latitude E4200		
ODM	Compal Corporation		
Target Launch Date	(2009/ 07/ 29)		
Antenna			
Brand Name	Amotech		
Part Number	■ Tx1 Antenna: AMNA-CB3-CP001		
	■ Tx2 Antenna : AMNA-CB3-CP001		
	■ Tx3 Antenna : AMNA-CB3-CP001		
Module			
With WLAN Module	□ 512ANX Family		
(Check Box)	□ 533AN Family		
	□ 512AN Family		

# Antenna Sample / Antenna Data Requirements for worldwide regulatory approval

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Section	Description of Required OEM / ODM					
Š	Antenna Information	US/IC	EU	Japan	Taiwan	S.Korea
1 <b>A</b>	Part Number for Antenna only	Required	Required	Required	Required	Required
1B	Antenna Manufacturer Name	Required	Required	Required	Required	Required
1C	Description of Antenna Type	Required	N/A	N/A	N/A	N/A
1D	Part number of Antenna Assembly / cable impedance, length & diameter.	Required	Desired	Desired	Desired	Desired
1E	Tx1, Tx2 & Tx3 antenna (Peak Gain W/ cable loss) *	Required	Required	Required	Required	Required
	1E OR 1F, 1G, 1H					
1F	Tx1, Tx2 & Tx3 antenna (Peak Gain only) *	Required	Required	Required	Required	Required
1G	VSWR of cable including connector	Required	Required	Required	Required	Required
1H	Tx1, Tx2 & Tx3 antenna (Cable loss W/ connector) *	Required	Required	Required	Required	Required
2	Dimensioned Photographs <u>and</u> Drawings of Tx1, Tx2, and Tx3 (or Rx3) antennas	Required	Required	Required	Required	Required
3	Radiation patterns of antennas loaded in the host platform.	Required	Desired	Required	N/A	Required
4	Platform model name / number - correlated to antenna manufacturer and antenna part number		Required	Desired	Required	Desired
5	Photograph(s) or Drawings showing location of antennas in platform. (S. Korea requires photographs of antennas for approval submission).  Taiwan requires pictures of each antenna type shown in the system.		Required	Desired	Required (Photos)	Required (Photos)
6	Mech. drawings / photos with dimensions of antenna locations and distance from end-user (For evaluation of SAR testing requirement).	Required	N/A	N/A	N/A	N/A
7	Photograph(s) or Drawings showing the location of all antennas (WLAN, other) and distance between those transmitting antennas. Information will be used to evaluate whether co-location testing is required.	Required	N/A	N/A	N/A	N/A
8	Local representative contact information for LMA/ PARS process.	Required	N/A	N/A	N/A	N/A

 $\frac{\rm NOTE:}{(^*) \text{ if } 3^{\rm rd}} \text{ antenna is Rx only (e.g. receive only for 4965AGN) then peak gain and cable loss not required}$ 

### **Antenna Information**

### **Section 1. Antenna Assembly Specifications**

**Antenna Assembly Summary:** 

1A	1B	1C	1D	1E	1F	1G	1H
Antenna Part	Manufacture	Antenna Type	Cable Assembly	*Peak Gain W/	Peak Gain w/o	VSWR	Cable Loss (dBi)
Number			Part Number and	Cable loss (dBi)	Cable Loss (dBi)		
			Information				
				2400-2500MHz	2400-2500MHz	2400-2500MHz	2400-2500MHz
			50 ohm Coaxial.	0.50 dBi (peak)	1.77 dBi (peak)	2.0 max	1.27 dBi (peak)
AMNA-CB1-CP001	AMOTECH	PIFA	length: 48.9cm	2496-2690MHz	2496-2690MHz	2496-2690MHz	2496-2690MHz
Tx1 antenna			diameter: 1.13mm	1.76 dBi (peak)	3.08 dBi (peak)	2.0 max	1.32 dBi (peak)
antenna			Connector:	5150-5350MHz	5150-5350MHz	5150-5350MHz	5150-5350MHz
			IPEX MHF	-0.23 dBi (peak)	1.80 dBi (peak)	2.0 max	2.03 dBi (peak)
				5470-5725MHz	5470-5725MHz	5470-5725MHz	5470-5725MHz
				-0.72 dBi (peak)	1.33 dBi (peak)	2.0 max	2.05 dBi (peak)
				5725-5850MHz	5725-5850MHz	5725-5850MHz	5725-5850MHz
				0.24 dBi (peak)	2.34 dBi (peak)	2.0 max	2.10 dBi (peak)
				2400-2500MHz	2400-2500MHz	2400-2500MHz	2400-2500MHz
AMNA-CB1-CP001			50 ohm Coaxial.	-1.58 dBi (peak) *	-0.40 dBi (peak) *	2.0 max	1.18 dBi (peak) *
Tx2	AMOTECH	PIFA	length: 45.2cm	2496-2690MHz	2496-2690MHz	2496-2690MHz	2496-2690MHz
antenna			diameter: 1.13mm	0.05 dBi (peak)*	1.27 dBi (peak) *	2.0 max	1.22 dBi (peak)*
			Connector: IPEX MHF	5150-5350MHz	5150-5350MHz	5150-5350MHz	5150-5350MHz
			II LX WII II	-1.94 dBi (peak) *	-0.05 dBi (peak) *	2.0 max	1.89 dBi (peak) *
				5470-5725MHz	5470-5725MHz	5470-5725MHz	5470-5725MHz
				-1.78 dBi (peak) *	0.12 dBi (peak) *	2.0 max	1.90 dBi (peak) *
				5725-5850MHz	5725-5850MHz	5725-5850MHz	5725-5850MHz
				-1.78 dBi (peak) *	0.16 dBi (peak) *	2.0 max	1.94 dBi (peak) *
				2400-2500MHz	2400-2500MHz	2400-2500MHz	2400-2500MHz
			50 ohm Coaxial.	-1.70 dBi (peak) *	-1.24 dBi (peak) *	2.0 max	0.46 dBi (peak) *
AMNA-CB1-CP001 Tx3	AMOTECH	PIFA	length: 17.8cm	2496-2690MHz	2496-2690MHz	2496-2690MHz	2496-2690MHz
antenna			diameter: 1.13mm Connector:	-1.70 dBi (peak)*	-1.22 dBi (peak) *	2.0 max	0.48 dBi (peak)*
antonna			IPEX MHF	5150-5350MHz	5150-5350MHz	5150-5350MHz	5150-5350MHz
			II LX WII II	-0.86 dBi (peak) *	-0.08 dBi (peak) *	2.0 max *	0.74 dBi (peak) *
				5470-5725MHz	5470-5725MHz	5470-5725MHz	5470-5725MHz
				-0.52 dBi (peak) *	0.25 dBi (peak) *	2.0 max *	0.75 dBi (peak) *
				5725-5850MHz	5725-5850MHz	5725-5850MHz	5725-5850MHz
				-0.33 dBi (peak) *	0.44 dBi (peak) *	2.0 max	0.77 dBi (peak) *

<sup>(\*)</sup> If Rx2/Rx3 only (2<sup>nd</sup> or 3<sup>rd</sup> antenna receives only, e.g. for 512 family & 4965AGN) then the information marked with \* is not required

#### **Antenna Peak Gain Table:**

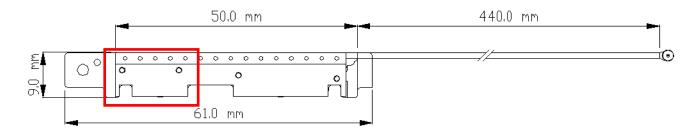
	Tx1 antenna		Tx2 (or Rx2) Antenna		Tx3 (or Rx3) Antenna	
Frequency (MHz)	Horizontal (dBi)	Vertical (dBi)	Horizontal (dBi)	Vertical (dBi)	Horizontal (dBi)	Vertical (dBi)
2400	-3.67	0.38	-4.78	-5.91	-3.37	-6.88
2450	-2.91	1.32	-2.55	-7.42	-2.00	-2.55
2500	-2.08	0.50	-2.88	-1.58	-1.70	-2.10
2501	-2.07	0.41	-2.91	-1.47	-1.74	-2.14
2593	-3.22	1.76	-2.22	-4.66	-7.03	-6.34
2685	-2.97	-0.61	-4.18	0.05	-3.14	-7.58
5150	1.78	-0.83	-1.66	-2.62	-3.46	-7.38
5250	0.62	-0.23	-2.41	-1.94	-0.86	-7.01
5350	1.40	-0.44	-1.25	-2.21	-2.41	-5.58
5470	-0.12	-0.93	-0.47	-2.03	-0.40	-7.29
5600	-0.40	-1.69	-2.46	-3.60	-1.38	-7.72
5725	-0.51	-0.72	-2.50	-1.78	-0.52	-7.59
5785	-0.47	-0.24	-2.10	-2.66	-1.26	-6.59
5850	-0.98	0.24	-3.34	-4.49	-0.33	-7.06

- Antenna Peak Gain required being test in system basis.
- 1E frame contend absolutely peak antenna gain include H/V
- If Rx2 only (2<sup>nd</sup> antenna receives only, e.g. for 512 family) then the information is not required for Rx2.
   If Rx3 only (3<sup>rd</sup> antenna receives only, e.g. for 4965AGN) then the information is not required for Rx3.

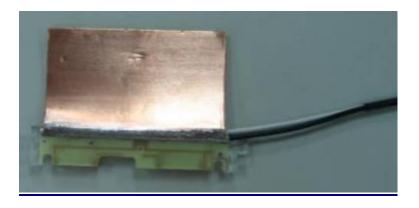
### **Section 2. Dimensioned Photos or Drawings of Antennas**

Include a dimensioned photo and dimensioned drawing of Tx1 antenna here.

#### **Tx1 Antenna Dimensioned Drawing:**

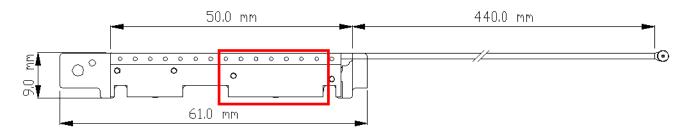


#### **Tx1 Antenna Photo:**

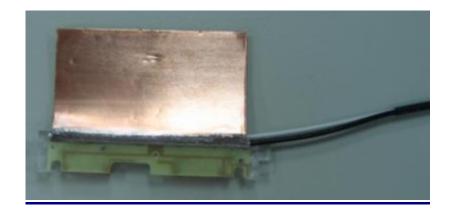


Include a dimensioned photo and dimensioned drawing of Tx2 (or Rx2) antenna here.

#### Tx2 (or Rx2) Antenna Dimensioned Drawing:



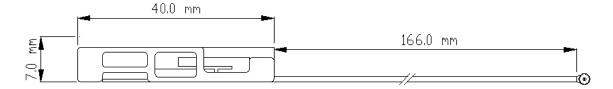
#### Tx2 (or Rx2) Antenna Photo:





Include a dimensioned photo and dimensioned drawing of Tx3 (or Rx3) antenna here.

#### Tx3 (or Rx3) Antenna Dimensioned Drawing:



#### Tx3 (or Rx3) Antenna Photo:

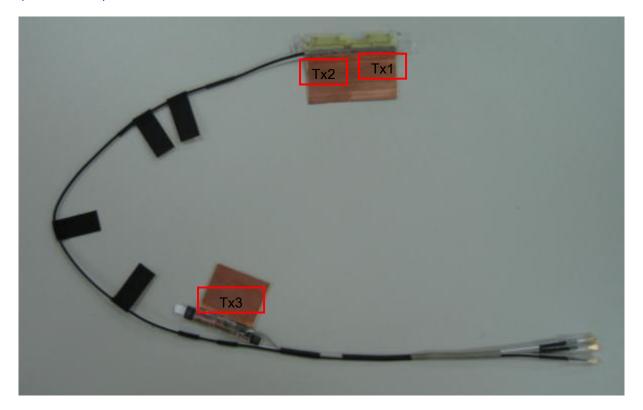


#### Include front view photo of all 3 antennas here.

Antenna Manufacturer: Amotech

Antenna Part Number: AMAN-CB3-CP001 (Tx1), AMAN-CB3-CP001 (Tx2 or Rx2), AMAN-CB3-CP001

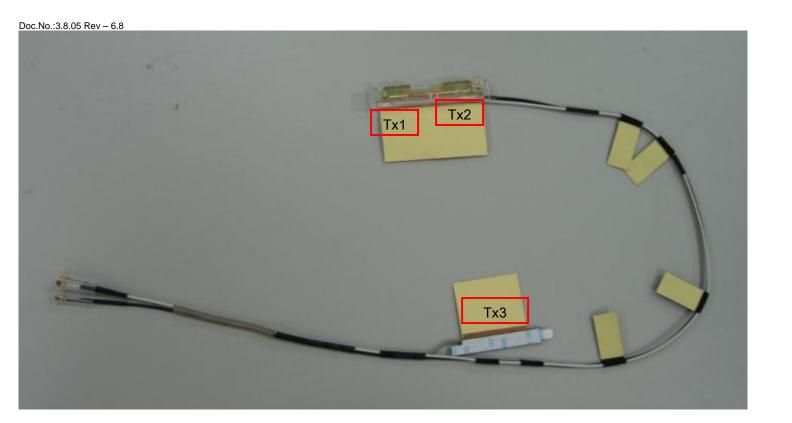
(Tx3 or Rx3)



#### Include back view photo of all 3 antennas here.

Antenna Manufacturer: Amotech

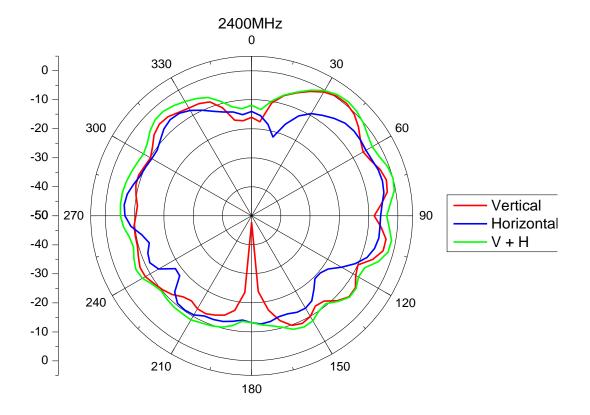
Antenna Part Number: AMAN-CB3-CP001 (Main), AMAN-CB3-CP001 (Aux), AMAN-CB3-CP001 (MIMO)



Section 3. Radiation characteristics of antennae Loaded in Host Platform

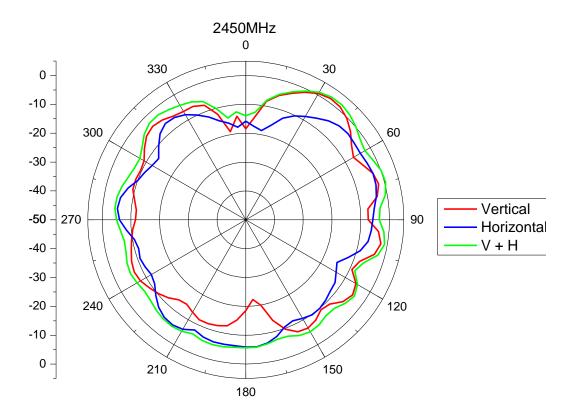
2400-2500MHz radiation characteristic

Tx1 antenna: 2400 MHz



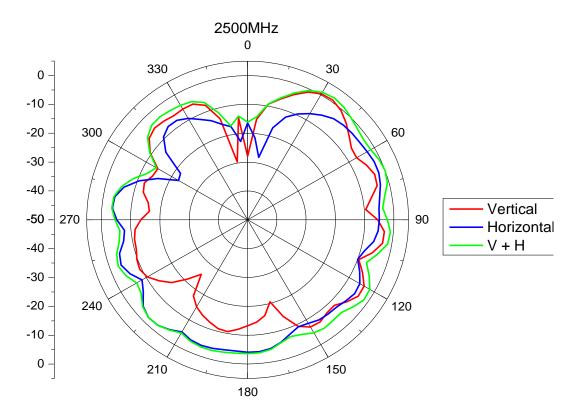
Center Frequency	2400 MHz
Horizontal (dBi) peak	-3.67
Vertical (dBi) peak	0.38

#### Tx1 antenna: 2450 MHz



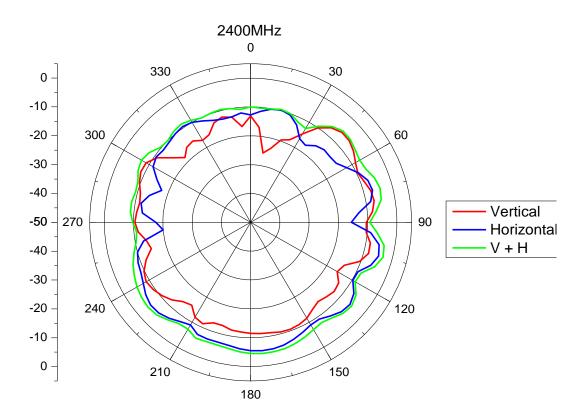
Center Frequency	2450 MHz
Horizontal (dBi) peak	-2.91
Vertical (dBi) peak	1.32

#### Tx1 antenna: 2500 MHz



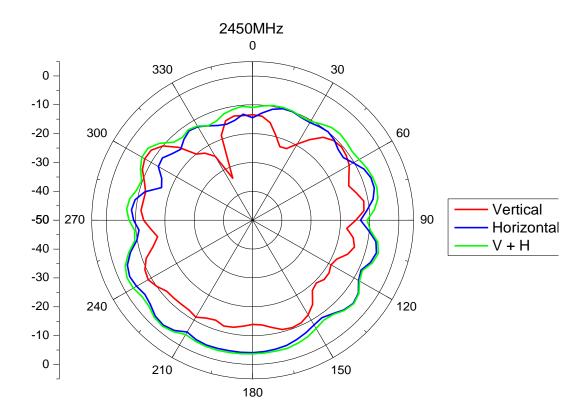
Center Frequency	2500 MHz
Horizontal (dBi) peak	-2.08
Vertical (dBi) peak	0.50

## Tx2 (or Rx2) antenna: 2400 MHz (Plot is not required if 2<sup>nd</sup> Antenna is receive only e.g. Rx2 for 512 family)



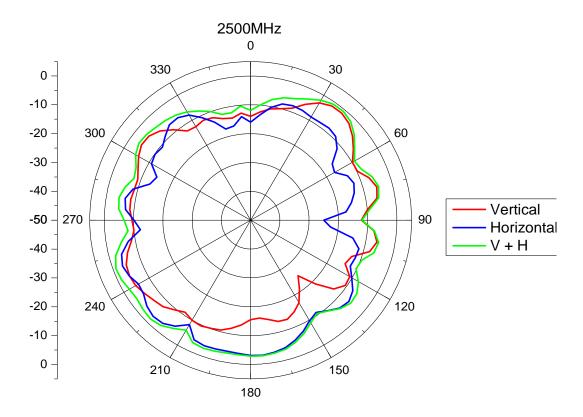
Center Frequency	2400 MHz
Horizontal (dBi) peak	-4.78
Vertical (dBi) peak	-5.91

## Tx2 (or Rx2) antenna: 2450 MHz (Plot is not required if 2<sup>nd</sup> Antenna is receive only e.g. Rx2 for 512 family)



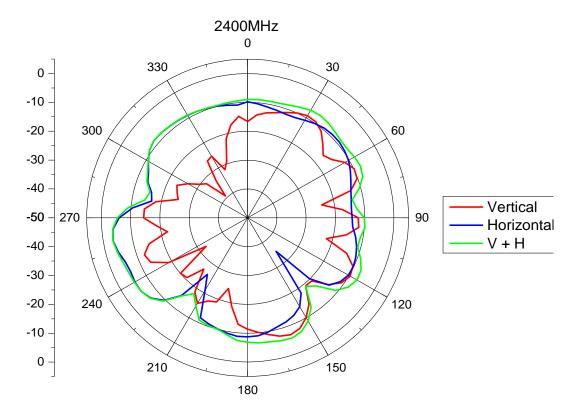
Center Frequency	2450 MHz
Horizontal (dBi) peak	-2.55
Vertical (dBi) peak	-7.42

## Tx2 (or Rx2) antenna: 2500 MHz (Plot is not required if 2<sup>nd</sup> Antenna is receive only e.g. Rx2 for 512 family)



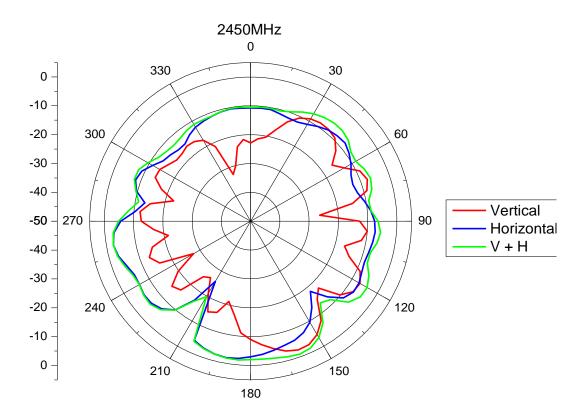
Center Frequency	2500 MHz
Horizontal (dBi) peak	-2.88
Vertical (dBi) peak	-1.58

### Tx3 (or Rx3) antenna: 2400 MHz (Plot is not required if 3<sup>rd</sup> Antenna is receive only e.g. Rx3 for 4965AGN)



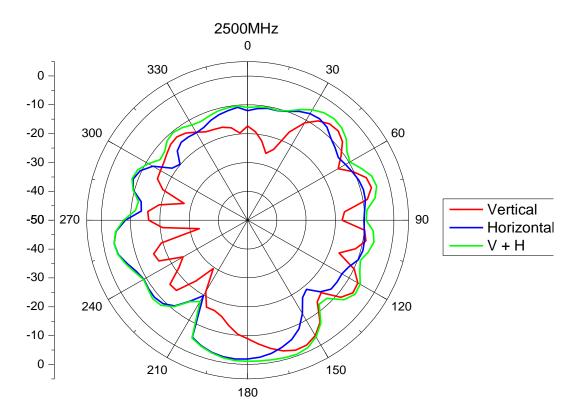
Center Frequency	2400 MHz
Horizontal (dBi) peak	-3.37
Vertical (dBi) peak	-6.88

## Tx3 (or Rx3) antenna: 2450 MHz (Plot is not required if 3<sup>rd</sup> Antenna is receive only e.g. Rx3 for 4965AGN)



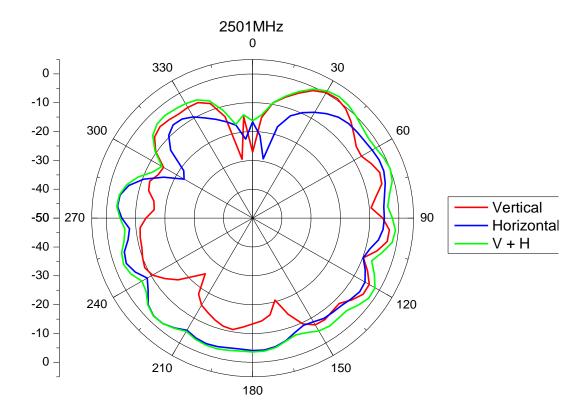
Center Frequency	2450 MHz
Horizontal (dBi) peak	-2.00
Vertical (dBi) peak	-2.55

## Tx3 (or Rx3) antenna: 2500 MHz (Plot is not required if 3<sup>rd</sup> Antenna is receive only e.g. Rx3 for 4965AGN)



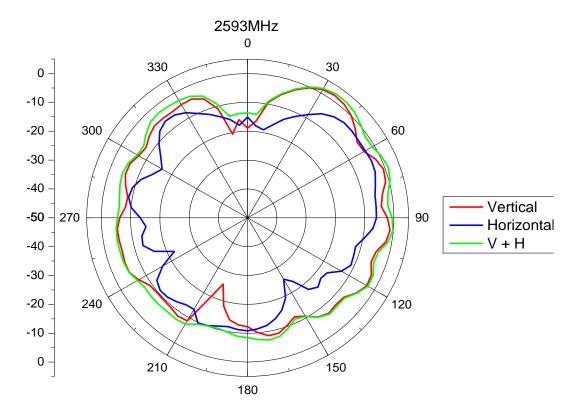
Center Frequency	2500 MHz
Horizontal (dBi) peak	-1.70
Vertical (dBi) peak	-2.10

#### Tx1antenna: 2501MHz



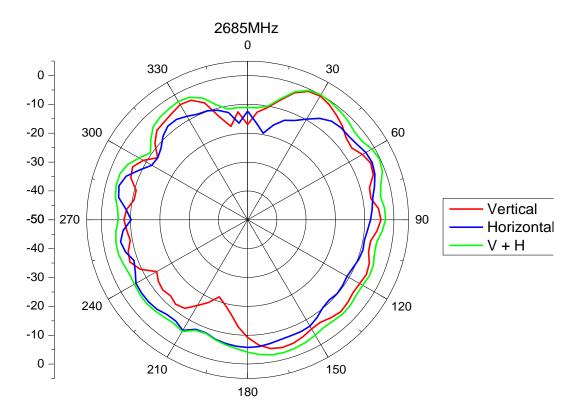
Center Frequency	2501 MHz
Horizontal (dBi) peak	-2.07
Vertical (dBi) peak	0.41

#### Tx1 antenna: 2593MHz



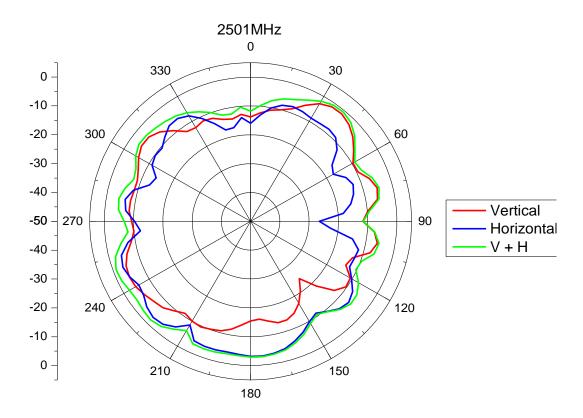
Center Frequency	2593 MHz
Horizontal (dBi) peak	-3.22
Vertical (dBi) peak	1.76

#### Tx1 antenna: 2685 MHz



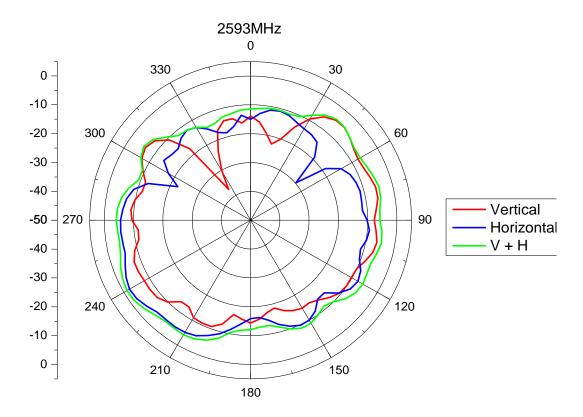
Center Frequency	2685 MHz
Horizontal (dBi) peak	-2.97
Vertical (dBi) peak	-0.61

## Tx2 (or Rx2) antenna: 2501MHz (Plot is not required if 2<sup>nd</sup> Antenna is receive only e.g. Rx2 for 512 family)



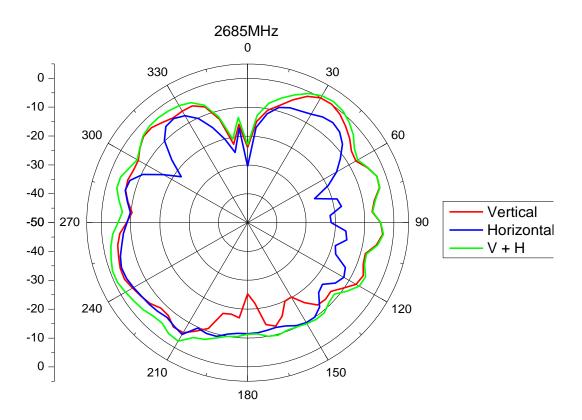
Center Frequency	2501 MHz
Horizontal (dBi) peak	-2.91
Vertical (dBi) peak	-1.47

## Tx2 (or Rx2) antenna: 2593MHz (Plot is not required if 2<sup>nd</sup> Antenna is receive only e.g. Rx2 for 512 family)



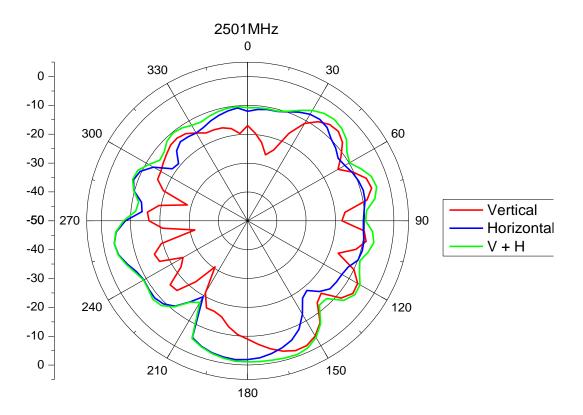
Center Frequency	2593 MHz
Horizontal (dBi) peak	-2.22
Vertical (dBi) peak	-4.66

## Tx2 (or Rx2) antenna: 2685 MHz (Plot is not required if 2<sup>nd</sup> Antenna is receive only e.g. Rx2 for 512 family)



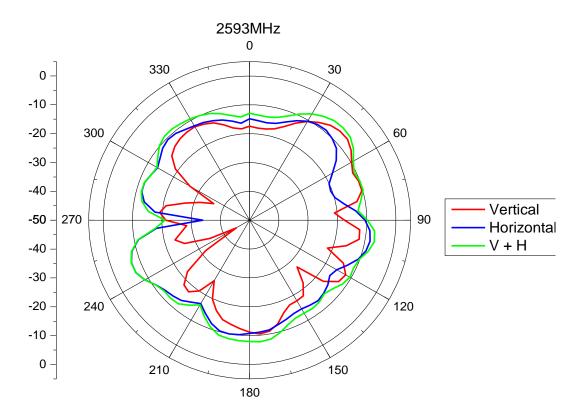
Center Frequency	2685 MHz
Horizontal (dBi) peak	-4.18
Vertical (dBi) peak	0.05

### Tx3 (or Rx3) antenna: 2501 MHz (Plot is not required if 3<sup>rd</sup> Antenna is receive only e.g. Rx3 for 4965AGN)



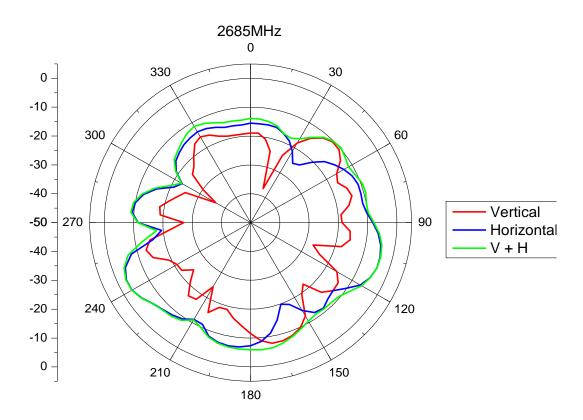
Center Frequency	2501 MHz
Horizontal (dBi) peak	-1.74
Vertical (dBi) peak	-2.14

### Tx3 (or Rx3) antenna: 2593MHz (Plot is not required if 3<sup>rd</sup> Antenna is receive only e.g. Rx3 for 4965AGN)



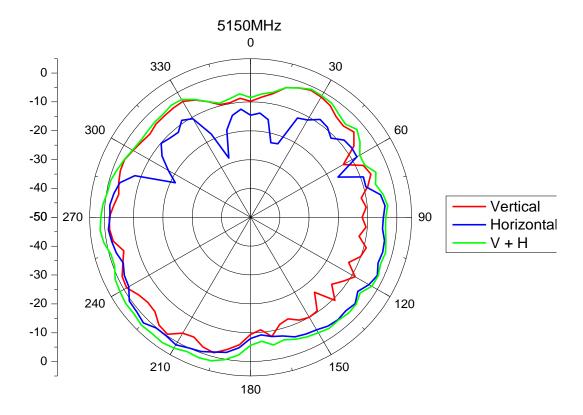
Center Frequency	2593 MHz
Horizontal (dBi) peak	-7.03
Vertical (dBi) peak	-6.34

## Tx3 (or Rx3) antenna: 2685 MHz (Plot is not required if 3<sup>rd</sup> Antenna is receive only e.g. Rx3 for 4965AGN)



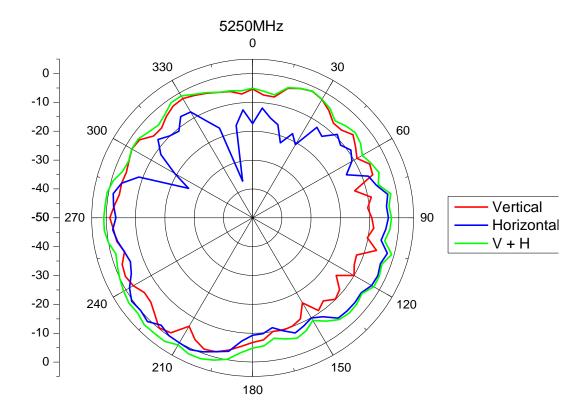
Center Frequency	2685 MHz
Horizontal (dBi) peak	-3.14
Vertical (dBi) peak	-7.58

#### Tx1 antenna: 5150 MHz



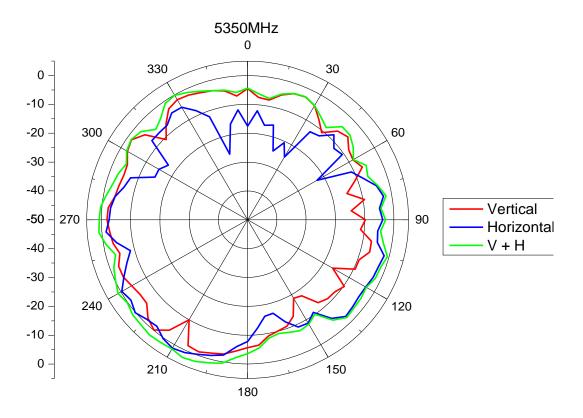
Center Frequency	5150 MHz
Horizontal (dBi) peak	1.78
Vertical (dBi) peak	0.83

#### Tx1 antenna: 5250 MHz



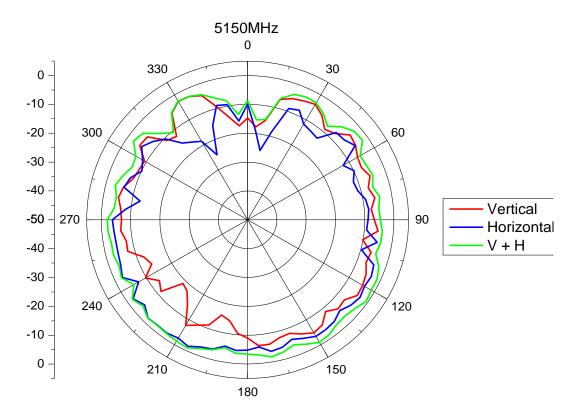
Center Frequency	5250 MHz
Horizontal (dBi) peak	0.62
Vertical (dBi) peak	-0.23

#### Tx1 antenna: 5350 MHz



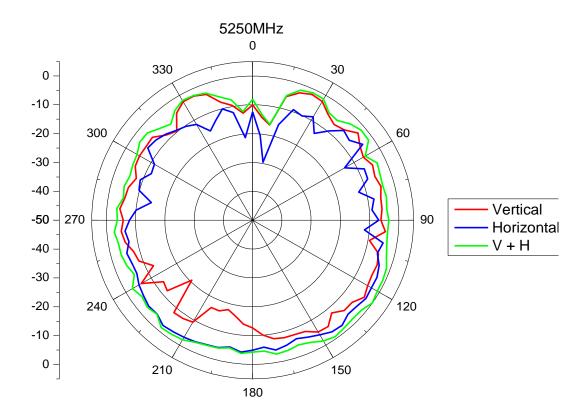
Center Frequency	5350 MHz
Horizontal (dBi) peak	1.40
Vertical (dBi) peak	-0.44

## Tx2 (or Rx2) antenna: 5150 MHz (Plot is not required if 2<sup>nd</sup> Antenna is receive only e.g. Rx2 for 512 family)



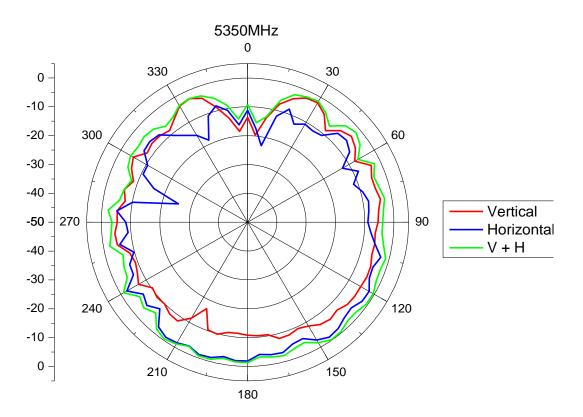
Center Frequency	5150 MHz
Horizontal (dBi) peak	-1.66
Vertical (dBi) peak	-2.62

## Tx2 (or Rx2) antenna: 5250 MHz (Plot is not required if 2<sup>nd</sup> Antenna is receive only e.g. Rx2 for 512 family)



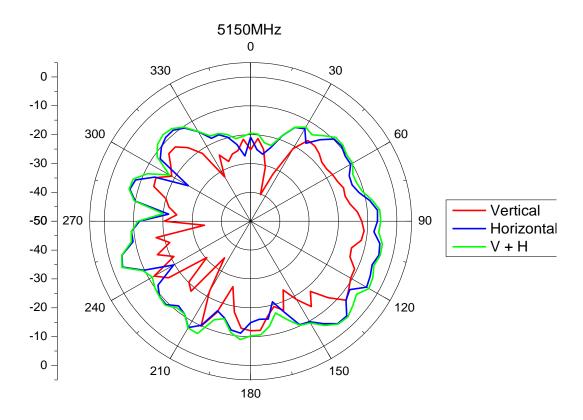
Center Frequency	5250 MHz
Horizontal (dBi) peak	-2.41
Vertical (dBi) peak	-1.94

## Tx2 (or Rx2) antenna: 5350 MHz (Plot is not required if 2<sup>nd</sup> Antenna is receive only e.g. Rx2 for 512 family)



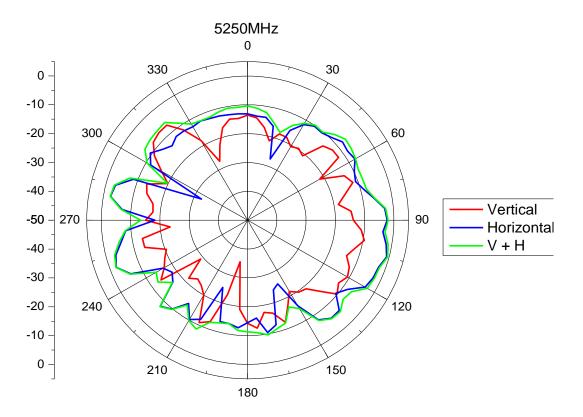
Center Frequency	5350 MHz
Horizontal (dBi) peak	-1.25
Vertical (dBi) peak	-2.21

### Tx3 (or Rx3) antenna: 5150 MHz (Plot is not required if 3<sup>rd</sup> Antenna is receive only e.g. Rx3 for 4965AGN)



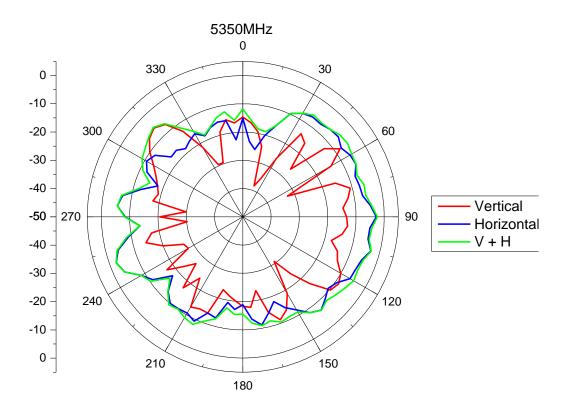
Center Frequency	5150 MHz
Horizontal (dBi) peak	-3.46
Vertical (dBi) peak	-7.38

### Tx3 (or Rx3) antenna: 5250 MHz (Plot is not required if 3<sup>rd</sup> Antenna is receive only e.g. Rx3 for 4965AGN)



Center Frequency	5250 MHz
Horizontal (dBi) peak	-0.86
Vertical (dBi) peak	-7.01

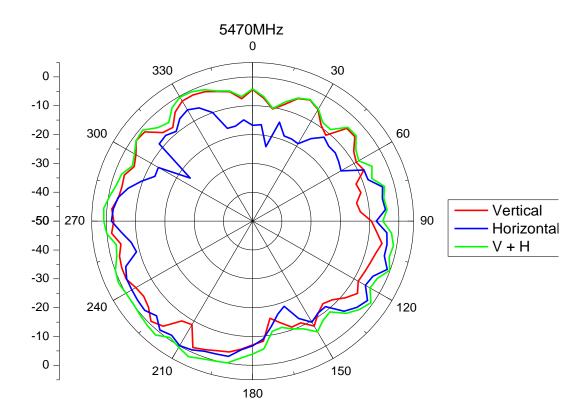
### Tx3 (or Rx3) antenna: 5350 MHz (Plot is not required if 3<sup>rd</sup> Antenna is receive only e.g. Rx3 for 4965AGN)



Center Frequency	5350 MHz
Horizontal (dBi) peak	-2.41
Vertical (dBi) peak	-5.58

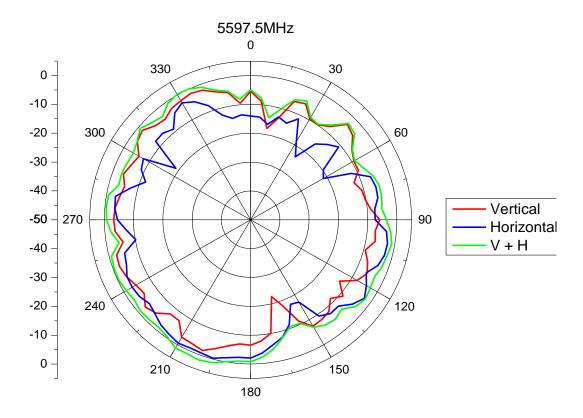
#### 5470-5725MHz radiation characteristic

#### Tx1 antenna: 5470 MHz



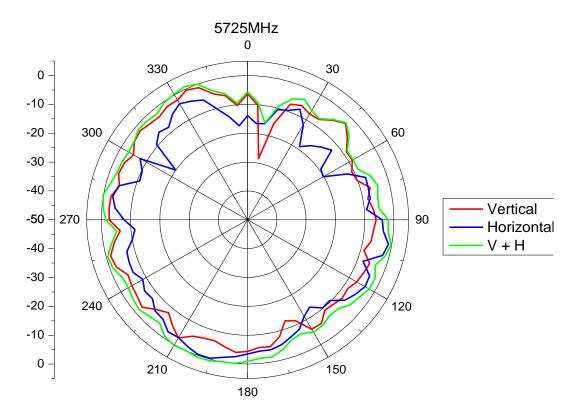
Center Frequency	5470 MHz
Horizontal (dBi) peak	-0.12
Vertical (dBi) peak	-0.93

#### Tx1 antenna: 5597.5 MHz



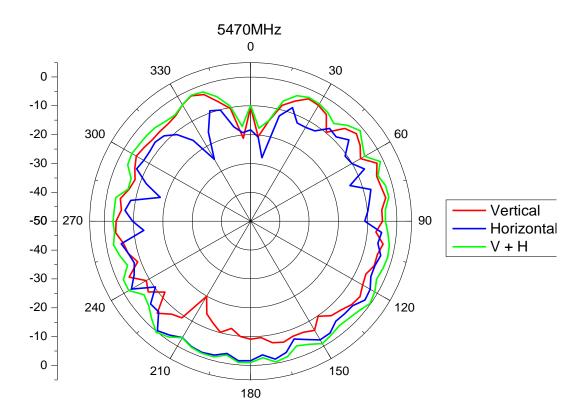
Center Frequency	5597.5 MHz
Horizontal (dBi) peak	-0.35
Vertical (dBi) peak	-1.65

#### Tx1 antenna: 5725 MHz



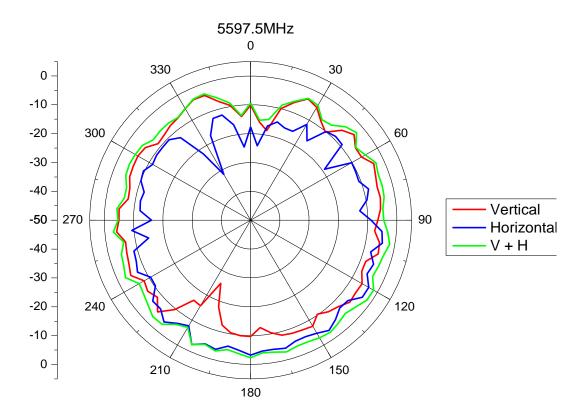
Center Frequency	5725 MHz
Horizontal (dBi) peak	-0.51
Vertical (dBi) peak	-0.72

# Tx2 (or Rx2) antenna: 5470 MHz (Plot is not required if 2<sup>nd</sup> Antenna is receive only e.g. Rx2 for 512 family)



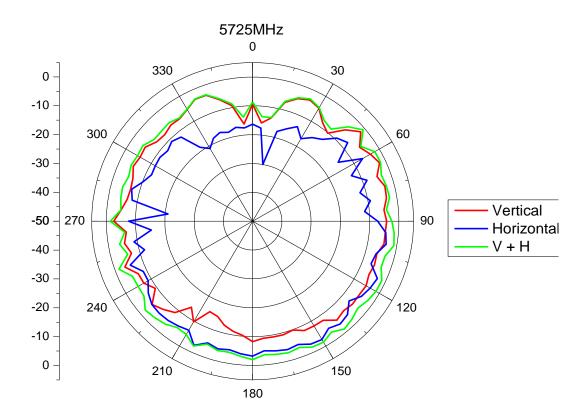
Center Frequency	5470 MHz
Horizontal (dBi) peak	-0.47
Vertical (dBi) peak	-2.03

# Tx2 (or Rx2) antenna: 5597.5 MHz (Plot is not required if 2<sup>nd</sup> Antenna is receive only e.g. Rx2 for 512 family)



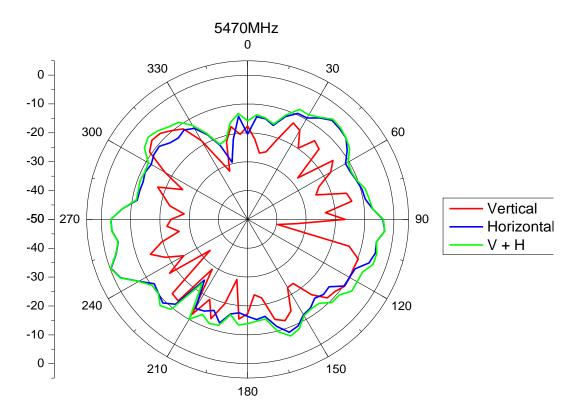
Center Frequency	5597.5 MHz
Horizontal (dBi) peak	-2.46
Vertical (dBi) peak	-3.60

# Tx2 (or Rx2) antenna: 5725 MHz (Plot is not required if 2<sup>nd</sup> Antenna is receive only e.g. Rx2 for 512 family)



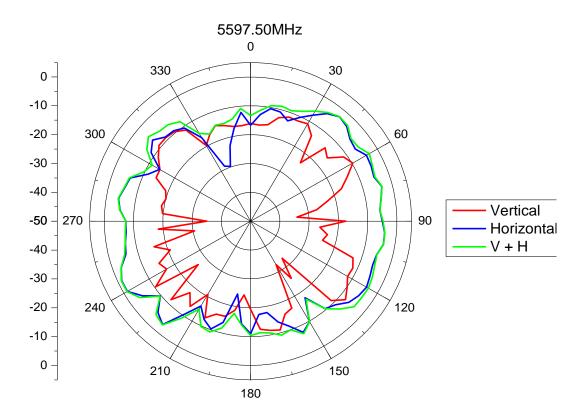
Center Frequency	5725 MHz
Horizontal (dBi) peak	-2.50
Vertical (dBi) peak	-1.78

### Tx3 (or Rx3): 5470 MHz (Plot is not required if 3<sup>rd</sup> Antenna is receive only e.g. Rx3 for 4965AGN)



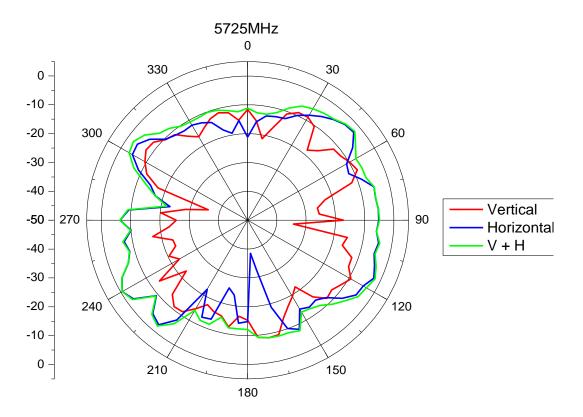
Center Frequency	5470 MHz
Horizontal (dBi) peak	-0.40
Vertical (dBi) peak	-7.29

## Tx3 (or Rx3) antenna: 5597.5 MHz (Plot is not required if 3<sup>rd</sup> Antenna is receive only e.g. Rx3 for 4965AGN)



Center Frequency	5597.5 MHz
Horizontal (dBi) peak	-1.38
Vertical (dBi) peak	-7.72

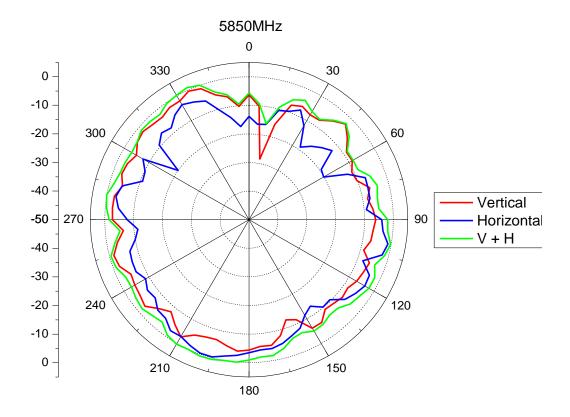
## Tx3 (or Rx3) antenna: 5725 MHz (Plot is not required if 3<sup>rd</sup> Antenna is receive only e.g. Rx3 for 4965AGN)



Center Frequency	5725 MHz
Horizontal (dBi) peak	-0.52
Vertical (dBi) peak	-7.59

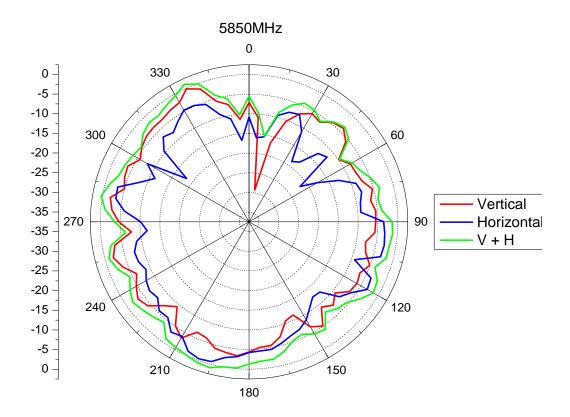
### 5725-5850 MHz radiation characteristic

#### Tx1 antenna: 5725 MHz



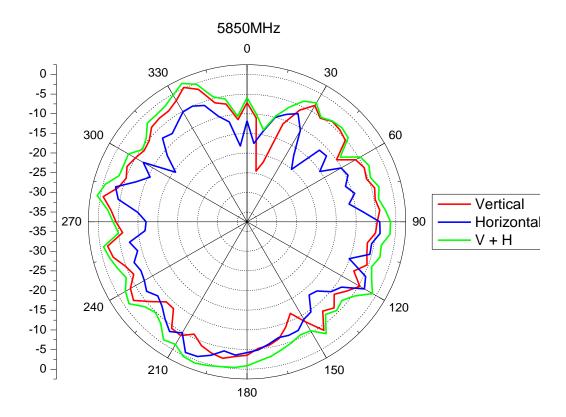
Center Frequency	5725 MHz
Horizontal (dBi) peak	-0.12
Vertical (dBi) peak	-0.93

#### Tx1 antenna: 5785 MHz



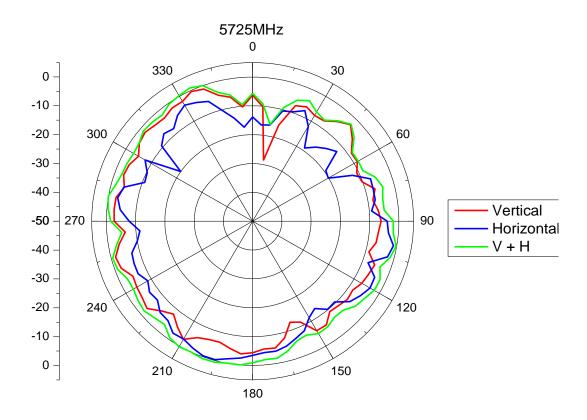
Center Frequency	5785 MHz
Horizontal (dBi) peak	-0.47
Vertical (dBi) peak	-0.24

#### Tx1 antenna: 5850 MHz



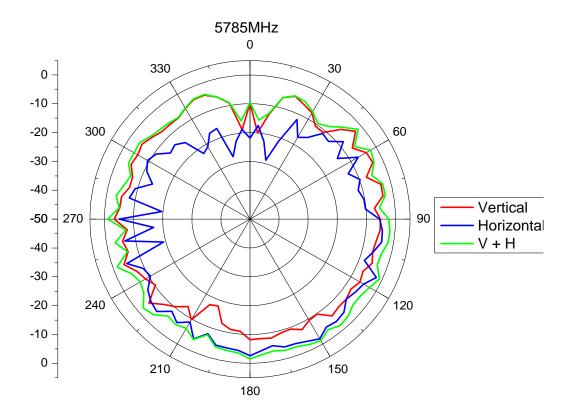
Center Frequency	5850 MHz
Horizontal (dBi) peak	-0.98
Vertical (dBi) peak	0.24

# Tx2 (or Rx2) antenna: 5725 MHz (Plot is not required if 2<sup>nd</sup> Antenna is receive only e.g. Rx2 for 512 family)



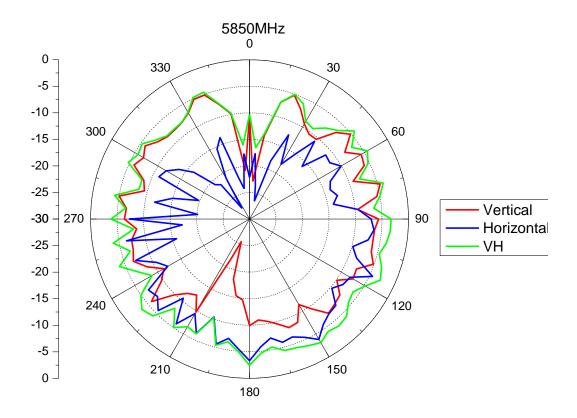
Center Frequency	5725 MHz
Horizontal (dBi) peak	-2.50
Vertical (dBi) peak	-1.78

# Tx2 (or Rx2) antenna: 5785 MHz (Plot is not required if 2<sup>nd</sup> Antenna is receive only e.g. Rx2 for 512 family)



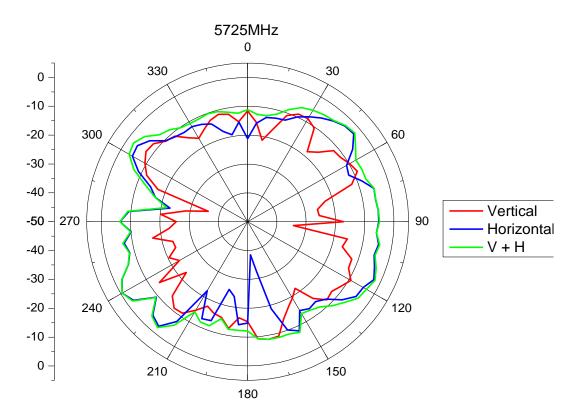
Center Frequency	5785 MHz
Horizontal (dBi) peak	-2.10
Vertical (dBi) peak	-2.66

# Tx2 (or Rx2) antenna: 5850 MHz (Plot is not required if 2<sup>nd</sup> Antenna is receive only e.g. Rx2 for 512 family)



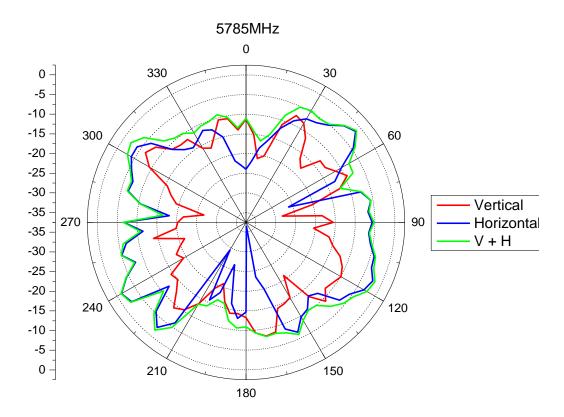
Center Frequency	5850 MHz
Horizontal (dBi) peak	-3.34
Vertical (dBi) peak	-4.49

## Tx3 (or Rx3) antenna: 5725 MHz (Plot is not required if 3<sup>rd</sup> Antenna is receive only e.g. Rx3 for 4965AGN)



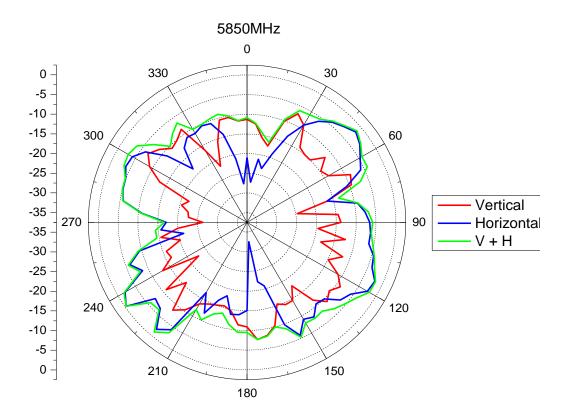
Center Frequency	5725 MHz
Horizontal (dBi) peak	-0.52
Vertical (dBi) peak	-7.59

## Tx3 (or Rx3) antenna: 5785 MHz (Plot is not required if 3<sup>rd</sup> Antenna is receive only e.g. Rx3 for 4965AGN)



Center Frequency	5785 MHz
Horizontal (dBi) peak	-1.26
Vertical (dBi) peak	-6.59

## Tx3 (or Rx3) antenna: 5850 MHz (Plot is not required if 3<sup>rd</sup> Antenna is receive only e.g. Rx 3 for 4965AGN)



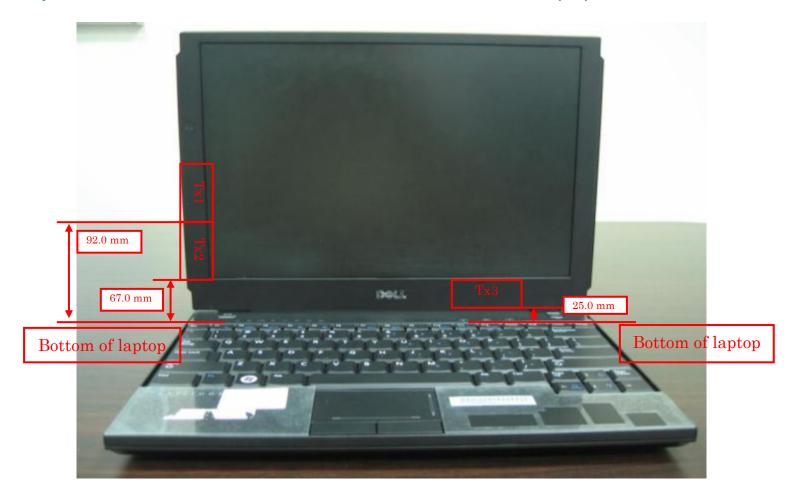
Center Frequency	5850 MHz
Horizontal (dBi) peak	-0.33
Vertical (dBi) peak	-7.06

### **Section 4. Host Platform Information**

OEM / ODM Host platform: (XXXXXXX) platform correlated to antenna data <a href="Rating-LabelPhoto:">Rating Label Photo:</a>

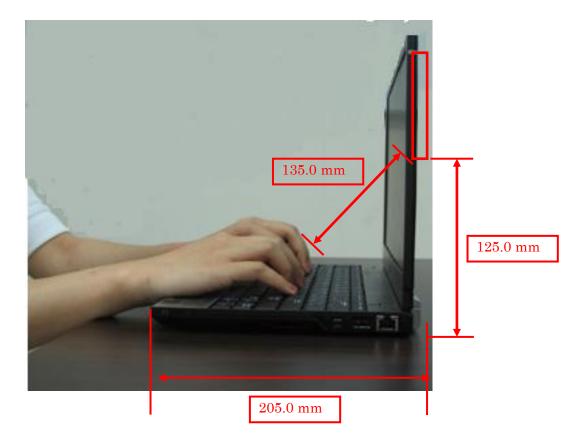
#### **Section 5. Antenna Host Platform Location Information**

Include a **dimensioned photo or dimensioned drawing** of Tx1, Tx2 and Tx3 antenna placements (measurements are not required for <u>receive-only</u> antenna). Any antenna that transmits must show dimensions to bottom of laptop.



### Section 6. Antenna dimensional information for SAR evaluation

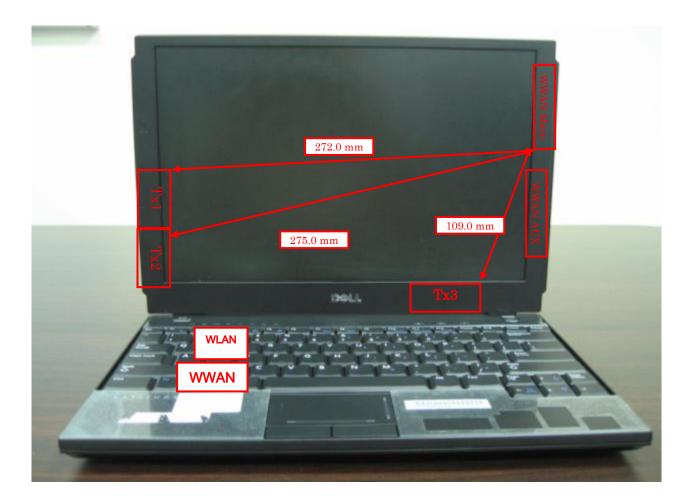
Include a **dimensioned photo or dimensioned drawing** showing the distance (mm) between the transmit antennas and the user (excluding hands, wrist, feet, lap/ thigh, and ankle)



### Section 7. Diagram Example of Co-Location Antenna Separation

Include a **dimensioned photo or dimensioned drawing** showing the distance (mm) between <u>all WLAN transmit antennas</u> and other co-located radiator transmit antenna such as Bluetooth, WWAN,..

(Note: Due to the evolving rules regarding co-location, each platform will need to be reviewed on a case by case basis)



## Section 8. Local representative contact information

Local representative contact information is required for regulatory support for target countries below.

	Local company name	Phone number	FAX Number	e-Mail Address	Notes
Argentina					
Brazil					
Indonesia					
Israel					
Malaysia					
Mexico					
Singapore					Telecommunication Equipment Dealer License Required
South Africa	_				
USA, Canada					